



**UNITED STATES DEPARTMENT OF COMMERCE**  
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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08/520,079 08/28/95 YAMAZAKI

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MM12/1129

EXAMINER

JACKSON JR, J

ART UNIT

PAPER NUMBER

2815

DATE MAILED:

11/29/99

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application N

520079

Applicant(s)

Yamashiki

Examiner

9

Group Art Unit

2815

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.

If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.

If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.

Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

## Status

9/2/99

☒ Responsive to communication(s) filed on \_\_\_\_\_

☒ This action is FINAL.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

☒ Claim(s) 73-144 is/are pending in the application.

Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 73-144 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_ ☐ Interview Summary, PTO-413

☐ Notice of Reference(s) Cited, PTO-892

☐ Notice of Informal Patent Application, PTO-152

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Other \_\_\_\_\_

Office Action Summary

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1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 73-144 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang '733 or '360 or '426 in view of Yamazaki '636.

The previous rejection still applies. Zhang in each reference teaches a recrystallized thin film transistor in which the crystal grain boundaries are much larger than the length of the channel regions. From Yamazaki it would have been obvious to have practiced carbon, nitrogen, and oxygen impurities at a concentration below  $5 \times 10^{18}/\text{cm}$  to improve the carrier lifetimes. Recitations of spin densities, etc. are considered inherent properties possessed by the prior art applied. The new claims reciting a particular method to measure C, O, and N concentrations do not structurally distinguish the claims over the prior art applied.

3. Applicant's arguments filed 7 September 1999 have been fully considered but they are not persuasive. Applicant's arguments that Zhang does not teach channel regions with no grain boundaries is unconvincing. Zhang '733 clearly discloses a "crystalline channel region". See column 4 lines 5-13, "...complete crystal can be accomplished by subsequent laser irradiation." The process used by Zhang to form crystalline regions is the same process used by applicant and forms the same crystalline regions. See also column 11 lines 29-31, "TFTs in the matrix region...the leakage current was less than  $10^{-13}$  A." Applicant's arguments regarding column 4

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lines 5-13 are unconvincing. The text states that laser irradiation removes the grain boundaries, similar to applicant's process. The process and structure taught in the prior art result in the same structure applicant claims. Arguments directed to Zhang '360 are likewise unconvincing. The entire specification of '360 is directed to forming channel regions and carrier flow paths in which the carriers do not cross crystal boundaries. See particularly column 9 lines 13-22 "if a length of an active layer...is within 40 micron, the source/drain region and channel region may be structured by the crystalline silicon film grown in the direction parallel to the substrate". Arguments regarding '426 are likewise unconvincing. See particularly figures 1A-1C where the extent of the grain boundaries are clearly shown to be outside the entire TFT structures. Not only are the channel regions monodomain but likewise are the source and drain regions. Applicant is quite correct in explaining that the semiconducting element is not preferably provided on the end of the crystallization at the grain boundary. It is clearly preferred to be located inside the grain boundary as shown in the figures. Applicant has shown no clear evidence that there are any grain boundaries in any of the channel regions of any of the applied Zhang references.

4. Claims 123 and 129 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The previous rejection still applies. There is no clear definition of the "S" value and how it is exactly determined in the claims.

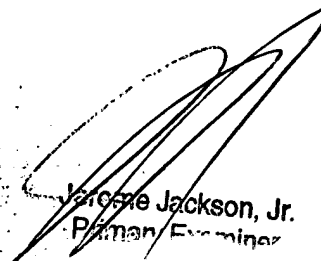
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5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerome Jackson whose telephone number is (703) 308-4937. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Jerome Jackson, Jr.  
Patent Examiner